

Before the  
**Federal Communications Commission**  
Washington DC 20554

In the Matter of	)	
	)	
	)	
Unlicensed Use of the 6 GHz Band	)	ET Docket No.18-295
	)	
Expanding Flexible Use in Mid-Band Spectrum	)	
Between 3.7 and 24 GHz	)	GN Docket No.17-183
	)	
	)	
	)	

**REPLY COMMENTS OF THE  
NATIONAL SPECTRUM MANAGEMENT ASSOCIATION**

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March 18, 2019

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The National Spectrum Management Association (“NSMA”)<sup>1</sup> submits these reply comments regarding the above captioned Notice of Proposed Rulemaking (NPRM).

**Introduction and Summary**

In this NPRM the Commission proposes rules that will introduce unlicensed use in portions of the 1200 megahertz of spectrum in the 5.925-7.125 GHz (6 GHz) bands. Relatively high-powered unlicensed devices would be permitted to operate in portions of two sub-bands (U-NII-5 and U-NII-7, totaling 850 megahertz of spectrum), subject to their use of an equipment-based frequency management mechanism whose purpose is to prevent the unlicensed devices from transmitting on frequencies where such transmissions could cause harmful interference to incumbent services. Lower powered indoor operations would be permitted to operate in two

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<sup>1</sup> The NSMA is a voluntary association of individuals in the spectrum management profession. Our goal is to promote rational spectrum policy through consensus.

other sub-bands (U-NII-6 and U-NII-8, totaling 350 megahertz of spectrum) unencumbered by frequency management.

### **Existing Licensed 6 GHz Frequency Allocations:**

**5.925-6.425 GHz:** Used by the fixed point to point (Part 101) and fixed satellite (uplink) (Part 25) services.

**66,324 fixed links**

**6.425-6.525 GHz:** Broadcast Auxiliary Service and Cable TV Relay mobile applications (Parts 74, 78 and 101).

**Mobile Special Event Services area licenses** (A single Mobile Special Event Services license such as a Broadcast Auxiliary radio service type Television Pickup license can represent an entire fleet of mobile microwave transmitters.

**6.525-6.875 GHz:** Used exclusively by fixed point to point service (Part 101).

**30,280 fixed links**

**6.875-7.125 GHz:** Primarily serves the Broadcast Auxiliary Service and the Cable Television Relay (“CARS”) Service (Parts 74, 78 and 101).

**5,051 fixed links**

### **Proposed Unlicensed Frequency Bands**

The NPRM proposes the following new unlicensed bands (FCC pages 10 and 29):

**U-NII-5:** 5.925-6.425 GHz Access Point EIRP maximum = 36 dBm

**U-NII-6:** 6.425-6.525 GHz Access Point EIRP maximum = 30 dBm

**U-NII-7:** 6.525-6.875 GHz Access Point EIRP maximum = 36 dBm

**U-NII-8:** 6.875-7.125 GHz Access Point EIRP maximum = 30 dBm

**All four U-NII bands:** Client Device EIRP maximum = 24 dBm

### **Unlicensed Radio System Discussion**

There has been considerable discussion among the commenters on this preceding regarding what would be appropriate frequency management and whether or not frequency management is even necessary for all RLAN systems. (It is.) Several RLAN comments suggested that low power RLAN Access Points would be deep inside buildings and not require frequency management. There was no discussion of Client locations (such as cell phones gravitating toward windows to improve cellular reception) or anticipated power levels (although

some commenters suggested Client transmit power should be similar to that of Access Points). Some commenters even proposed RLANs in cars, buses, trains and planes; they propose pre-coordinating over areas the devices could reach. Some commenters suggested frequency management should use the Winner II stochastic path model<sup>2</sup> for deterministic paths and the USGS Land Use and Land Clutter data<sup>3</sup> to determine path obstructions. The impracticality of this was also commented on by FS experts.

Overall there has been considerable wide-ranging discussion. Regardless of range of comments, we assert there are still some critical areas not clearly delineated.

## **A. Licensed Fixed Service Must be Protected from Harmful Interference**

The Commission's rules are clear: Licensed services must be protected from harmful interference<sup>4</sup>. Several RLAN commenters suggest management of interference is not necessary for low to moderate power RLAN transmitters. They contend interference will be rare and therefore not worthy of consideration. We do not agree. We know from more than thirty years of frequency management experience that the "rare cases" are in fact the performance limiting cases that must be managed or they will significantly impair Fixed Service reliability. We assert

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<sup>2</sup> <https://cept.org/files/8339/winner2%20-%20final%20report.pdf>, per page 26, "WINNER channel model is a geometry based stochastic [non-deterministic] model."

<sup>3</sup> [https://sagemap.wr.usgs.gov/ftp/n\\_dakota/NDGS/1\\_250\\_LULC.htm](https://sagemap.wr.usgs.gov/ftp/n_dakota/NDGS/1_250_LULC.htm), polygons of minimum size of 10 acre with no height data

<sup>4</sup> Title 47: Telecommunication, C.F.R. § 15.5(b), "Operation of an [unlicensed] intentional, unintentional, or incidental radiator is subject to the conditions that no harmful interference is caused ... [to] the operation of an authorized radio station ....")

frequency management is always required if inter-system interference is to be controlled - which it legally must.

## **B. Frequency Management must be Based Upon Industry Consensus**

We are proposing to merge two groups with significantly different operational philosophies. The FS operators operate like airline companies. They operate to achieve zero service failures. Quality of Service is managed and documented. The RLAN operators operate like individual car owners. Service management varies with the user and occasional failures are expected in the course of normal operation. Quality of Service is rarely managed.

To achieve a harmonious relationship, the two groups must work together using a methodology acceptable to both. Of course, it must support the legal rights of all FS operators, not just “promoting investment” in RLAN technology. For this reason, the frequency management process must be based upon the needs of all stakeholders, not just one industry group. The Automated Frequency Coordination (AFC) process proposed in the NPRM is acceptable to us as long as it is group independent and consensus based to ensure proper protections from harmful interference. We note that, as proposed, the AFC is actually Automated Frequency Assignment (AFA) rather than more traditional coordination (existing users have no oversight in the process). Given the novelty of the concept and the extremely large numbers of RLANs expected, a cautious, monitored implementation is recommended.

## C. The Interference Criterion must be Reaffirmed for Fixed Service

Over time the Commission and the FS community developed their interference criterion<sup>5</sup>:

One dB degradation of receiver threshold or equivalently  $I/N = -6$  dB. This is currently the interference criterion used for frequency management in the FS bands. This definition must be reaffirmed in this proceeding to maintain the quality of service to which FS operators have engineered their networks.

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<sup>5</sup> TIA/EIA, *Interference Criteria for Microwave Systems*, Telecommunications Systems Bulletin TSB10-F at B-1, Annex B, Section B-2 (June 1994), [one dB receiver threshold degradation].

ITU-R Recommendation F.758-6, *System Parameters and Considerations in the Development of Criteria for Sharing or Compatibility Between Digital Fixed Wireless Systems in the Fixed Service and Systems in Other Services and Other Sources of Interference*, Geneva: International Telecommunication Union, Radiocommunication Sector at 9, Table 2 (Sept. 2015), [ $I/N = -6$  dB].

Title 47: Telecommunication, C.F.R. §101.103 Frequency coordination procedures.

(d) Frequency coordination. For each frequency authorized under this part, the following frequency usage coordination procedures will apply:

(1) General requirements. "... In engineering a system or modification thereto, the applicant must, by appropriate studies and analyses, select sites, transmitters, antennas and frequencies that will avoid interference in excess of permissible levels to other users. ..."

Title 47: Telecommunication, C.F.R. §101.105 Interference protection criteria.

(b) In addition to the requirements of paragraph (a) of this section the adjacent channel interference protection criteria to be afforded, regardless of system length, or type of modulation, multiplexing, or frequency band, must be such that the interfering signal does not produce more than 1.0 dB degradation of the practical threshold of the protected receiver.

c) Applying the criteria. (1) Guidelines for applying the interference protection criteria for fixed stations subject to this part are specified in the Telecommunications Industry Association's Telecommunications Systems Bulletin TSB 10, "Interference Criteria for Microwave Systems" (TSB 10) [1.0 dB receiver threshold degradation].

## CONCLUSION

In principle we support the Commission's approach to merge licensed and unlicensed services. If this can be successfully implemented, it will usher in a new, highly efficient, approach to frequency management.

There are many perspectives in the current proceeding. We wish to emphasize the legal rights and operational needs of the Fixed Service community. There are many diverse details to work through but we don't want the following high-level details forgotten:

1. The Fixed Service must be accorded its legal right to interference protection.
2. The Fixed Service must be protected from interference on the basis of industry-wide consensus, not special interests.
3. The current Fixed Service interference criterion must be maintained.
4. The extremely high reliability of Fixed Service operations for crucial services must be left unimpaired.

We look forward to working with the Commission in this new world of disparate services frequency management.

Respectfully submitted,

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